

Translation

PATENT COOPERATION TREATY

PCT/JP2003/010935



PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 310300916WO1	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/JP2003/010935	International filing date (day/month/year) 28 August 2003 (28.08.2003)	Priority date (day/month/year)
International Patent Classification (IPC) or national classification and IPC H01L 27/04, G06K 19/07, 19/077		
Applicant HITACHI, LTD.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of \_\_\_\_\_ sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 06 October 2003 (06.10.2003)	Date of completion of this report 07 April 2004 (07.04.2004)
Name and mailing address of the IPEA/JP	Authorized officer
Facsimile No.	Telephone No.

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/JP2003/010935

## I. Basis of the report

### 1. With regard to the elements of the international application:\*

- ☒ the international application as originally filed
- ☐ the description:  
 pages \_\_\_\_\_, as originally filed  
 pages \_\_\_\_\_, filed with the demand  
 pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_
- ☐ the claims:  
 pages \_\_\_\_\_, as originally filed  
 pages \_\_\_\_\_, as amended (together with any statement under Article 19  
 pages \_\_\_\_\_, filed with the demand  
 pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_
- ☐ the drawings:  
 pages \_\_\_\_\_, as originally filed  
 pages \_\_\_\_\_, filed with the demand  
 pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_
- ☐ the sequence listing part of the description:  
 pages \_\_\_\_\_, as originally filed  
 pages \_\_\_\_\_, filed with the demand  
 pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_

### 2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language \_\_\_\_\_ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

### 3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

### 4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, Nos. \_\_\_\_\_
- ☐ the drawings, sheets/fig \_\_\_\_\_

### 5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).\*\*

\* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).

\*\* Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

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## V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

### 1. Statement

Novelty (N)	Claims	1-9	YES
	Claims		NO
Inventive step (IS)	Claims		YES
	Claims	1-9	NO
Industrial applicability (IA)	Claims	1-9	YES
	Claims		NO

### 2. Citations and explanations

Document 1: JP, 2002-337827, A (HITACHI, LTD.), 27 November 2002  
 Document 2: JP, 6-181289, A (TOSHIBA CORPORATION), 28 June 1994  
 Document 3: JP, 2001-284533, A (OKI ELECTRIC INDUSTRY CO., LTD.), 12 October 2001  
 Document 4: JP, 2000-331830, A (FUJI ELECTRIC CO., LTD.), 30 November 2000  
 Document 5: US, 2002-0016020, A1 (Mitsuo USAMI), 07 February 2002  
 Document 6: US, 2002-0074666, A1 (Mitsuo USAMI), 20 June 2002  
 Document 7: CD-ROM of the specification and drawings annexed to the written application of Japanese Utility Model Application No. 5771/1999 (Laid-open No. 3066278) (K.K. SHOKUICHI), 24 November 1999  
 Document 8: JP, 2003-76961, A (TOPPAN PRINTING CO., LTD.), 14 March 2003

#### Claims 1, 2, 4

The subject matter of claims 1, 2, and 4 does not involve an inventive step on account of documents 1-3 cited in the ISR.

Paragraphs [0031]~[0032] of document 1 describe a structure comprising an integrated circuit 40 and an on-chip antenna 41 that is insulated from the integrated circuit 40 on a silicon substrate; the thickness is 0.05 mm, i.e. a thickness equal to or less than 50  $\mu\text{m}$ .

Document 2 describes using Au as the material for an inductance 6 formed on a semiconductor substrate.

Document 3 says the specific width of an on-chip coil is 5~20  $\mu\text{m}$ .

This being the case, in the invention described in document 1, using the Au described in document 2 as the specific material for an on-chip antenna and making the specific width of the on-chip antenna about 5~20  $\mu\text{m}$  as described in document 3 is a mere matter of design variation to be appropriately selected by a person skilled in the art in order to achieve the desired characteristics.

Furthermore, the communication distance depends on the antenna material, antenna size, frequency of the sending and receiving waves, strength of the sending and receiving waves, substrate material, substrate thickness, distance between antenna and substrate, etc., so there appears to be no critical significance in simply limiting the substrate thickness or the antenna width or thickness.

**VIII. Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Claims 1 and 2 are not adequately supported by the specification.

Claim 1 says "the surface of said silicon substrate is laminated in the sequence of said antenna, insulating layer, and integrated circuit," so the invention described in claim 1 appears to be constituted so that the antenna is formed on the silicon substrate surface, the insulating layer is formed on the antenna, and the integrated circuit is formed on the insulating layer.

Nevertheless, the preferred embodiment for practicing the invention describes a structure wherein the integrated circuit is formed on the silicon substrate surface, an insulating layer is provided on this integrated circuit, and the antenna is formed on the insulating layer.

Furthermore, the same applies to claim 2.

Claim 1 is unclear.

The unit "micron" in the descriptions "200 microns" and "2.6 microns" and "10 microns" in claim 1 is unclear.

Furthermore, the same applies to "micron" as used in the specification.

Claims 3-9 are unclear.

Claims 3-9 cite claims 1 and 2, but the term "wireless device" does not appear in claim 1 or 2, so the corresponding relationship is unclear.

Claim 3 is unclear.

A term corresponding to "said resin layer" used in claim 3 does not appear in claim 1 or 2, so the corresponding relationship is unclear.

Claim 4 is unclear.

The meaning of "width less than 10  $\mu\text{m}$ " in claim 4 is unclear.

Claim 5 is unclear.

The meaning of "said wireless device side and antenna side" in claim 5 is unclear.

Claim 9 is unclear.

Claims 1 and 2 refer to an "insulating layer" but the term "resin layer" does not appear, so the corresponding relationship between the "insulating layer" used in claims 1 and 2 and the "resin layer" used in claim 9 is unclear.

Specification, page 10, line 7, is unclear.

The explanation of Fig. 8 says "layer 804 includes the on-chip antenna and a semiconductor element" but nothing marked 804 appears in Fig. 8, so the corresponding relationship is unclear.

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## Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of Box V.2:

## Claim 3

The subject matter of claim 3 does not involve an inventive step on account of documents 1-4 cited in the ISR.

Document 4 describes a structure that uses a contact hole 6b having a gradual taper in a contact hole 6 in order to electrically connect an inductor on an integrated circuit and the integrated circuit. This is a technical matter which a person skilled in the art would normally consider in order to improve product quality as much as possible in the invention described in document 1, so employing the structure described in document 4 as the specific contact hole does not appear to present any special difficulty.

## Claim 5

The subject matter of claim 5 does not involve an inventive step on account of documents 1-5 cited in the ISR.

Embodiment 1 in document 5 describes a structure wherein an antenna 16 is disposed on the sticky side of a film substrate 15 that has a sticky material 14 as a specific handling structure for an IC chip, so employing the film having a sticky material described in document 5 as a specific handling structure does not appear to present any special difficulty.

## Claim 6

The subject matter of claim 6 does not involve an inventive step on account of documents 1-6 cited in the ISR.

Paragraph [0020] in document 6 says it is possible to also attach a radiative antenna, as with an on-chip coil, so the question of whether or not to connect a radiative antenna is a mere matter of design variation to be appropriately selected by a person skilled in the art in order to achieve the desired function.

## Claim 7

The subject matter of claim 7 does not involve an inventive step on account of documents 1-7 cited in the ISR.

Paragraph [0050] in document 7 describes an application example in which a semiconductor chip 111 is spread on/mixed into paper. Also, Fig. 3(b) of document 7 describes an application example wherein an IC chip 9 is disposed on a paper 10 having a recess, and a paper 8 is overlaid. Therefore disposing an IC chip on a material having a recess and spreading on/mixing in paper as a specific IC chip application example could easily be conceived by a person skilled in the art.

## Claim 8

The subject matter of claim 8 does not involve an inventive step on account of documents 1-8 cited in the ISR.

Document 8 describes an application example that attaches an IC chip to a staple sewing tool, so using one in a staple sewing tool as a specific IC chip application example could easily be conceived by a person skilled in the art.

## Claim 9

The subject matter of claim 9 does not involve an inventive step on account of documents 1-5 cited in the ISR.

Embodiment 2 in document 5 describes a method that forms an integrated circuit on an SOI substrate, etches silicon using an oxide film, and separates with the etching; so employing this specific method does not appear to present any special difficulty.